

**U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE AND TECHNOLOGY
SUBCOMMITTEE ON TECHNOLOGY & INNOVATION**

HEARING CHARTER

The Globalization of R&D and Innovation, Pt. IV: Implications for the Science and Engineering Workforce

Tuesday, November 6, 2007

2:30 p.m. – 4:30 p.m.

2318 Rayburn House Office Building

1. Purpose

On Tuesday, November 6, 2007, the Committee on Science and Technology's Subcommittee on Technology & Innovation will hold a hearing to consider the implications of the globalization of research & development (R&D) and innovation for the American science, technology, engineering and mathematics (STEM) workforce. This hearing—the fourth in a series of hearings examining the impact of globalization on innovation—will explore the impact of high-technology offshoring on American STEM workers and students. Witnesses will discuss the new opportunities and challenges for workers created by globalization, including how globalization is reshaping the demand for STEM workers and skills. The witnesses will also address how offshoring is affecting the STEM workforce pipeline and how incumbent workers are responding to globalization.

2. Witnesses

Dr. Michael S. Teitelbaum is vice president of the Alfred P. Sloan Foundation. He is a demographer who has studied the supply and demand science and engineering labor market.

Dr. Harold Salzman is senior research associate at the Urban Institute. He is a sociologist who has a recent study on the STEM workforce pipeline and offshoring.¹

Dr. Charles McMillion is president and chief economist of MBG Information Services. He is an expert in evaluating economic trade data, particularly trade in advanced technology with China.

Mr. Paul J. Kostek is vice president for career activities of the Institute for Electrical and Electronics Engineers—USA. IEEE-USA is the largest professional engineering society in America. The Career Activities Committee focuses on promoting the career-related policy interests of electrical, electronics and computer engineers and related information technology professionals, with a special focus on U.S. members.

Mr. Henry Becker is president of Qimonda North America, a supplier of memory products with facilities and offices in North America, Europe, and Asia.

¹ *Into the Eye of the Storm: Assessing the Evidence on Science and Engineering Education, Quality, and Workforce Demand*. Available at http://www.urban.org/UploadedPDF/411562_Salzman_Science.pdf

3. Brief Overview

- Most analysts believe that globalization will not affect the aggregate number of jobs in the U.S. However, they believe it will change the mix of occupations. Certain occupations will experience net losses while others will increase, and the skills demanded will shift.
- Some analysts estimate that between 30 and 40 percent of *all* U.S. jobs will be vulnerable to offshoring. This vulnerability reflects the fact that a large share of previously non-tradable jobs has become tradable, putting downward pressures on wages for U.S. workers in those occupations.
- High-wage jobs requiring advanced STEM education and skills are also offshorable, and some analysts estimate they are among the most vulnerable to offshoring with computer programming topping the list of all occupations. According to a study conducted by Alan Blinder, director of Princeton University's Center for Economic Policy Studies, 35 of 39 STEM occupations are offshorable, including 10 of 12 engineering disciplines.
- Other analysts highlight the opportunities created by globalization. With emerging markets growing rapidly, demand for STEM-intensive products and services will grow. The transfer of complementary activities to lower-cost countries will spur greater demand for STEM workers.
- Offshoring is affecting the pipeline of STEM workers. Undergraduate enrollments in some STEM fields, particularly computer sciences, are down significantly over the past few years in part because students believe these jobs are vulnerable to offshoring.
- Analysts also believe that globalization may inject greater volatility in the STEM job market and workers need to be prepared to re-tool their skills on an ongoing basis.

4. Issues and Concerns

How will the globalization of R&D and innovation affect the supply of, and demand for, the STEM workers in America? Most analysts believe that globalization will not affect the aggregate number of jobs in the U.S. However, it will change the mix of occupations. Certain occupations will experience net losses while others will increase and the skills demanded will shift. Most analysts believe that the globalization will affect the number and mix of STEM workers needed. What do we know about the effects so far? Will workers in low-cost countries complement American STEM workers thus spurring demand? Or will those workers be substitutes for American STEM workers? How will these trends affect the STEM-workforce pipeline?

What are the numbers and types of jobs that will face increased competition from low-cost countries? Some jobs will move overseas and others will stay. What do we know about the types of jobs that are likely to be geographically sticky and those that are more footloose? Do the economic and trade data provide us an indication of the division of labor between America and low-cost countries? What skills will be in demand?

Is an inadequate supply of American STEM workers with specific skills causing companies to move offshore? Will producing more workers with specific skills prevent work from moving offshore?

What kinds of challenges do American STEM workers face in the wake of globalization, and what resources do they have to ensure they have careers that are both durable and resilient?

Many analysts believe that globalization will cause greater volatility in the job market. Do STEM workers have the right set of tools and the right support to ensure they are able to keep their jobs? If they do get displaced are they able to quickly re-enter the job market? Do STEM workers face different challenges given their specialized knowledge? Incumbent workers face increased competition and potentially job and wage loss. What happens to those who are displaced?

How has offshoring changed the risks and rewards, costs and benefits, of a STEM career? How do we ensure that the next generation of workers gets the right kinds of education? What types of skills will be needed in the future? Globalization is expected to change the types of work in demand in the United States. A number of universities are responding to globalization by emphasizing innovation and creativity and de-emphasizing more technical work, with the expectation that the latter can be codified and therefore easier to offshore.

How are countries that are receiving high-skill jobs responding to the new opportunities? Can we predict what types of jobs they are actively pursuing now and will pursue in the next few years?

A common narrative of globalization is that lower-skill, labor-intensive jobs will move offshore while higher level work will remain in the U.S. Is this narrative accurate? Are workers receiving clear labor market signals about jobs and skills that will be in demand and those that will be rendered obsolete by globalization?